

## CLAIMS

1. A particulate separator comprising:

a substantially hollow cylindrical shaped chamber having an inside wall, and drive shaft which extends through the chamber, the drive shaft having a plurality of radially projecting members which project into the chamber, a drive source, the drive source engaged to the drive shaft and constructed and arranged to provide the drive shaft with a predetermined rotation rate, a separator plate, the separator plate being positioned within chamber to divide the chamber into a first section and a second section;

the first section having:

10 an air stream inlet port, the air stream inlet port constructed and arranged to allow an air stream to enter the chamber, the air stream having particulate matter suspended therein, the first section constructed and arranged to separate at least a portion of the particulate matter from the air stream to form separated particulate; and

15 an aperture, the aperture having a predetermined length which corresponds to a predetermined length of the first section, the aperture being covered by a gate, the gate being pivotally engaged to the chamber, the gate having a shape which corresponds to the cylindrical shape of the inside wall of the chamber, the gate having an open position and a closed position, in the open position the at least a  
20 portion of the separated particulate being directed into the aperture, in the closed position the gate being constructed and arranged such that any of the separated particulate which may have accumulated on the gate is removed by one or more of the plurality of radially projecting members;

the separator plate having:

25 an air outlet port, the air outlet port being positioned through the separator plate, the separator plate constructed and arranged to allow the air stream to pass through the air outlet port from the first section and into the second section while preventing separated particulate from leaving the first section;

the second section having:

30 at least one water inlet port, the at least one water inlet port constructed and arranged to place water inside the second section, the plurality of radially

extending members which are positioned within the second section being constructed and arranged to mix at least a portion of the particulate suspended in the air stream with the water thereby creating water encapsulated particles; and

an outlet port, the outlet port constructed and arranged to

5 allow the water encapsulated particles and the air stream to leave the chamber.

2. The particulate separator of claim 1 further comprising a separated particulate collector, the separated particulate collector positioned adjacent to the aperture, the separated particulate collector having a housing, the housing having a predetermined  
10 length, the housing containing a rotatable trough screw, the rotatable trough screw having a predetermined length, the predetermined length of the trough screw being less than the predetermined length of the housing.

3. The particulate separator of claim 2, the collector constructed and arranged to  
15 receive separated particulate from the aperture of the first section, the trough screw constructed and arranged to draw the separated particulate through the housing to an end of the housing where the separated particulate is allowed to accumulate thereby forming a continuously advancing plug of separated particulate.

20 4. The particulate separator of claim 1 wherein the air stream inlet port is in fluid communication with an air flow apparatus, the air stream traveling from the air flow apparatus to the chamber.

5. The particulate capture system of claim 4 wherein the air flow apparatus is  
25 selected from the group consisting of coolers, dryers, hammer mills, and any combination thereof.

6. The particulate separator of claim 5, further comprising:  
a water tank, the water tank in fluid communication with the outlet port,  
30 the water encapsulated particles flowing from the outlet port to the water tank; and  
a director plate, the air stream being directed by the director plate over the

water encapsulated particles in the water tank.

7. The particulate separator of claim 6 further comprising a water pump and water pipe, the water pipe in fluid communication with the water tank and the air flow apparatus, the water pump constructed and arranged to pump a predetermined quantity of water encapsulated particles from the water tank, through the water pipe to the air flow apparatus.
8. The particulate capture system of claim 1, the plurality of radially extending members each comprising a support shaft and a paddle, the paddles having a face, the face being angled relative to the support shaft between approximately 10 to 25 degrees.
9. The particulate capture system of claim 1, the plurality of radially extending members which are positioned in the first section having a predetermined length, the plurality of radially extending members which are positioned in the second section having a predetermined length, the predetermined length of the plurality of radially extending members in the first section being greater than the predetermined length of the plurality of radially extending members which are positioned in the second section.
10. The particulate capture system of claim 1, the drive source constructed and arranged to rotate the drive shaft at a rate between 500 and 2300 rpm.
11. The particulate capture system of claim 10, the drive source constructed and arranged to rotate the drive shaft at a rate of 1100 rpm.
12. The particulate capture system of claim 1 wherein the particulate capture system replaces a cyclone in a meal rendering system.
13. A method of treating heated meat meal product comprising the following steps:  
exposing a predetermined quantity of heated meat meal product to a cooling system wherein an air stream is directed over the predetermined quantity of

heated meat meal product;

directing the air stream into the particulate capture system of claim 1;

separating particulate matter from the air stream;

directing the water encapsulated particulate back to the cooling system;

5        spraying the predetermined quantity of heated meat meal product with the water encapsulated particulate;

releasing the air stream into the atmosphere.

14.     The particulate separator of claim 6, further comprising a water pump and water  
10 pipe, the water pipe in fluid communication with the water tank and the air flow apparatus, the water pump constructed and arranged to pump a predetermined quantity of water encapsulated particles from the water tank, through the water pipe to the cooler.

15.     The particulate separator of claim 6, further comprising a water pump and water  
15 pipe, the water pipe in fluid communication with the water tank and the air flow apparatus, the water pump constructed and arranged to pump a predetermined quantity of water encapsulated particles from the tank, through the water pipe to a drain for disposal.

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